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Modeling Large Area ICP Sources with

Chlorine Chemistry,* R. BERGER, G. DIPESO, G.J. PARKER, N. TISHCHENKO, and P. VITELLO, , LLNL - Chlorine discharges in high density, low pressure inductively coupled plasma (ICP) reactors present a variety of issues including multiple ion species (both positive and negative) and dissociation of molecular Cl_2 . We present results here of computer modeling of the LLNL Large Area ICP Source. The Large Area Source is 30" diameter and is designed to study 400 mm processing. Computer simulations using the 2-D fluid code, INDUCT95, are used to study variations in the plasma density profile as a function of inductive power, pressure, coil design, chamber aspect ratio, and surface recombination coefficient for the conversion of Cl to Cl_2 . A high degree of electro-negativity is predicted for low power operation ($\leq 100\text{W}$). For high powers ($\leq 1000\text{W}$), Cl_2 is found to be largely dissociated to Cl. Modeling results show that a high degree of uniformity is possible over a 400 mm diameter area.

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